THE

ONTARIO WATER RESOURCES

COMMISSION

WATER QUALITY

in

STREAMS TRIBUTARY TO ST. MARYS RIVER

SAULT STE. MARIE

1966

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ONTARIO WATER
RESOURCES COMMISSION

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REPORT

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R E P O R T

INTRODUCTION

A water quality survey of the various streams which are tributary to the St. Marys River was carried out on September 15 and 16, 1966. This study coincided with a detailed survey of the main watercourse carried out by the Water Quality Surveys Branch of the Ontario Water Resources Commission.

BACKGROUND

In 1962, the Ontario Water Resources Commission found evidence of domestic pollution in several of the smaller creeks which drain into the St. Marys River. Since that time, residential development in the Sault Ste. Marie area has progressed at a rapid pace. In the same period, the municipality in co-operation with the Ontario Water Resources Commission has undertaken an extensive program of sanitary sewage works including trunk sewers and an 8.0 mgd primary sewage treatment plant. A 20-year program for the future development of sewage works has been adopted.

This report makes no attempt to evaluate specific sources of pollution either from domestic or industrial sources. Rather the object of the study was to assess the sanitary quality and apparent usage of the various watercourses.

AREA OF STUDY

A total of ten large and small streams were examined in this

survey including the following:

Root River
Coldwater Creek
Clark Creek
Fort Creek
West Davignon Creek
East Davignon Creek
Bennett Creek
Central Creek
Big Carp River
Little Carp River

In total, these watercourses drain an area in excess of 100 square miles of which 93 square miles lies within the limits of the City of Sault Ste. Marie. In length, they vary from a maximum of 19 miles for the Root River to a minimum of one mile in Clark Creek. Close to 75,000 persons are resident in the area covered by this study.

TOPOGRAPHY

Roughly 15 per cent of the area studied is presently urbanized. For the most part, the remaining lands are wooded and give way on the north to typical Laurentian Shield formations with scrub timber and granite outcroppings.

The headwaters of most of the tributary streams rise at an elevation of 900-1,100 feet. At the point of confluence with the St. Marys River the mean elevation is 603 feet above the canal locks and 580 feet below.

STREAM USAGE

Water Supply

None of the watercourses in this study are used as a source

of municipal water supply. So far as is known, there are no private domestic supplies which utilize these waters as their source.

A fish hatchery operated by the Ontario Department of Lands and Forests is located on Clearwater Creek and makes use of the water from this source for both water supply and overflow disposal.

RECREATIONAL USE

Hiawatha Park, a 130-acre game preserve on Crystal Creek, a tributary of the Root River, is a popular local recreation area in both summer and winter. None of the other watercourses are of significance for recreational purposes although the Big Carp and Little Carp rivers empty into the St. Marys in the Carpin Beach area.

STREAM FLOWS

No attempt was made to measure the various watercourses in terms of volume of flow since time, personnel and equipment were not available. However, wherever possible an estimate of the flow is included as a general guide to the scope of the study.

EXPLANATION OF LABORATORY RESULTS

A total of 21 samples were taken at various locations. Bacteriological analyses were performed by the Ontario Department of Health Regional Laboratory in Sault Ste. Marie. Samples for chemical analyses were forwarded to the OWRC Laboratory in Toronto. The results of all analyses are appended to this report along with an area map

indicating the sampling locations.

The significance of the laboratory analyses may best be explained as follows:

Bacteriological Examination

The MPN or Most Probable Number technique is a commonly applied procedure for determining the presence of coliform organisms. These organisms are normal inhabitants of the intestinal tract of humans and other warm-blooded animals. The E. Coli organism is more specific to humans and is a more certain indication of domestic pollution of faecal origin.

The OWRC objective for stream sanitation is a total coliform density of not greater than 2,400 organisms per 100 ml.

Sanitary Chemical Analyses

(1) Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (ppm) and is an indication of the amount of oxygen required for the stabilization of decomposable organic matter in the water. The Commission's objective for stream water quality is an upper limit of 4 ppm.

Although BOD itself is not a precise indication of domestic pollution, high values in the presence of excessive coliform counts generally denote the presence of organic wastes from a human source.

(2) Solids

The effects of suspended solids in water are reflected in difficulties associated with water purification, depositions in streams and injury to the environment of fish. Values in excess of 15 ppm are considered excessive.

(3) Turbidity

Turbidity is caused by the presence of suspended matter such as clay, silt, finely divided organic matter, plankton and other microscopic organisms in water.

(4) Phenols

Phenolic substances are generally associated with petroleum products and as such are used as an indication of pollution from industrial sources. The Commission recommends that phenols should not exceed 2 parts per billion in a stream.

DISCUSSION OF SAMPLE RESULTS

For simplicity, the laboratory results and their significance are discussed under watershed headings.

Root River and Clearwater Creek

Both the river and its tributary show little evidence of pollution in upstream portions. However, samples taken in areas close to the point at which the watercourses terminate indicate that pollution by domestic wastes is fairly extensive. Most of this contamination would appear to originate in the Garden River

Road-Fourth Line area and in areas to the west along Third and Fourth Line.

Clark Creek

This creek originates in swampy lands south of Hwy #17 and flows south through newer residential areas in the east end of the city and through the Sault Ste. Marie Golf Course. The excessive coliform organism counts and high solids and turbidity values are no doubt due to domestic waste discharges which were observed in the area just north of Queen Street East.

Fort Creek

A large portion of this creek which passes through the west central part of the city is contained in box culverts beneath streets and buildings. The water quality in the upper reaches of the water-course appears satisfactory. However, there is evidence of pollution in its passage through built-up areas. The sample taken at St. Andrews Terrace (No.9) indicates that extensive pollution occurs in the underground section between Bloor Street and Wellington Street.

East Davignon Creek

As in the case of Fort Creek, a large section of this creek is carried underground through residential areas. Pollution by domestic wastes north of Second Line is indicated. This contamination is not readily apparent at the creek outlet (Sample No.11) due to the introduction of more than 3.0 million gallons per day of cooling water

with little or no coliform organisms.

West Davignon, Bennett and Central Creeks

The results of samples from Central Creek reveal moderate pollution by domestic wastes most probably originating in the Korah Road area north of Hwy #550. A similar condition exists in West Davignon Creek at Hwy #550 with a slight increase in coliform organisms apparent at Wallace Terrace. At its outlet near the Algoma Steel works, West Davignon Creek has merged with both Central and Bennett creeks and appears more seriously polluted by both domestic and industrial wastes. The samples from Bennett Creek also show a marked increase in coliforms as the watercourse passes through residential areas in Korah West.

Big Carp and Little Carp Rivers

The single sample from Little Carp River was found to contain excessive coliforms indicating recent pollution by domestic sewage. Although this area of the city has sparse development there are a number of dwellings close to the river on Base Line and the Town Line.

The Big Carp River on the other hand shows little evidence of contamination in the same general area. However, 1/4 mile from its confluence with the St. Marys River at Carpin Beach, the river contains coliforms well in excess of the OWRC objective.

SUMMARY AND CONCLUSIONS

In a sampling study carried out on September 15 and 16, 1966

pollution by domestic wastes was found in a number of minor watercourses which enter the St. Marys River at Sault Ste. Marie. Although no attempt was made to locate specific sources of contamination, a review of various reports indicates that a number of factors contribute to pollution of the watercourses. Among these are malfunctioning septic tank systems and the existence of a number of older combined sewers.

In their 1965 Drainage Report, Proctor and Redfern, Consulting Engineers, stressed the need for early development of sanitary and storm sewers and the separation of flows in the older sections of the city. In view of the evidence of pollution found in this survey it is apparent that such works must be proceeded with at an early date. A more detailed study of the individual watercourses by local authorities would no doubt be of value in locating individual sources of pollution such as improper drains and malfunctioning septic tanks.

RECOMMENDATION

Action should be taken by the municipality to prevent pollution of the tributary streams.

Approved by G. H. Mills

G. H. Mills, P. Eng.,
District Engineer,
Division of Sanitary Engineering.

/ct

TABLE 1

SAMPLE RESULTS

Sample Point No.	5-Day BOD	Total	Susp.	Turbidity Units	Phenols in ppb	Total Coliforms per 100 ml	E. Coli per 100 ml	Estimated Flow in cfs
1	0.3	80	25	1.0	0	93	23	5
2	2.1	98	9	8.0	0	4,600	1,100	30
3	0.5	98	2	1.4	0	240	23	2
4	1.3	174	12	3.1	0	24,000	930	2
5	1.5	370	26	13.5	0	4,600	460	0.1
6	1.4	172	30	18	4	93	23	0.4
7	1.8	242	36	31	4	1,100	150	0.5
8	2.8	196	36	40	3	750	43	0.5
9	22	212	20	29	4	240,000	460	1.0
10	3.0	184	24	10.5	4	21,000	21,000	1.0
11	6.8	214	24	26	6	210	75	12.0

1 Root River - at 5th Line - South of City Dump
2 Root River - at Hwy. #7 East
3 Coldwater Creek - at Lands and Forests Fish Hatchery
4 Coldwater Creek - at Garden River Road
5 Clark Creek - North Side of Queen St. East
6 Fort Creek - at Second Line
7 Fort Creek - at Conmee Ave.
8 Fort Creek - at Bloor St.
9 Fort Creek - at St. Andrews Terrace
10 East Davignon Creek - at Second Line
11 East Davignon Creek - at Outlet

Sample Point No.	5-Day BOD	Total	Susp.	Turbidity Units	Phenols in ppb	Total Coliforms per 100 ml	E. Coli per 100 ml	Estimated Flow in cfs
12	1.4	160	32	27	4	7,500	2,400	0.1
13	2.4	156	30	26	4	7,500	2,400	0.2
14	1.6	112	4	5.0	4	24,000	4,600	1.0
15	1.4	80	10	6.0	2	46,000	2,400	1.5
16	2.4	104	6	7.5	8	11,000	4,600	3.0
17	1.0	112	13	9.5	4	2,400	93	1.0
18	1.0	100	8	6.0	2	110,000	460	1.0
19	1.0	96	12	9.0	3	93	43	2.0
20	1.2	126	8	6.5	2	240,000	4,600	3.0
21	0.8	92	3	3.3	4	46,000	4,600	0.7

12 Central Creek - at Hwy. #550
13 Central Creek - at Wallace Terrace
14 West Davignon Creek - at Hwy. #550
15 West Davignon Creek - at Wallace Terrace
16 West Davignon Creek - at Base Line (outlet)
17 Bennett Creek - at Hwy. #550
18 Bennett Creek - at Wallace Terrace
19 Big Carp River - at Town Line
20 Big Carp River - at Beach Road
21 Little Carp River - at Base Line